DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 06/09/2008 with respect to claims 1-4 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al. (US PAT. 6,771,706 hereinafter, "Ling") in view of Hwang et al. (U.S PAT. 7,333,551 hereinafter, "Hwang").

Consider claim 1, Ling teaches a transmitting apparatus that transmits a signal to a receiving apparatus using Multiple-Input Multiple-Output, the transmitting apparatus, comprising: a reception section that receives information indicating the number of effective eigenvalues, said number of effective eigenvalues being calculated at the receiving apparatus (col. 4 lines 48-67); a number of multiplex sequences control

section that determines the number of multiplex sequences based on the number of effective eigenvalues (col. 4 lines 48-67).

Ling does not explicitly show that performs serial to parallel conversion on transmission data of one sequence into transmission data of the number of multiplex sequences; and a transmission section that transmits the transmission data of each sequence after serial to parallel conversion via different transmission streams by space-time coding.

In the same field of endeavor, Hwang teaches performs serial to parallel conversion on transmission data of one sequence into transmission data of the number of multiplex sequences (col. 8 line 36 through col. 9 line 5 and col. 10 lines 25-55); and a transmission section that transmits the transmission data of each sequence after serial to parallel conversion via different transmission streams by space-time coding (col. 8 line 36 through col. 9 line 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use, performs serial to parallel conversion on transmission data of one sequence into transmission data of the number of multiplex sequences; and a transmission section that transmits the transmission data of each sequence after serial to parallel conversion via different transmission streams by space-time coding, as taught by Hwang, in order to provide a data transmission/reception apparatus and method for maximizing a data rate in a mobile communication system using space-time trellis code.

Consider claim 2, Hwang further teaches the number of multiplex sequences control section increases the number of multiplex sequences of the transmission data as the number of the effective eigenvalues increase (col. 6 lines 15-24).

Consider claim 3, Hwang further teaches the transmission section controls a space-time coding method based on the number of effective eigenvalues (col. 8 line 36 through col. 9 line 5).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ling in view of Kim (US PAT. 7,171,240 hereinafter, "Kim") and in view of Hwang.

Consider claim 4, Ling teaches a communication method performing a communication using Multiple-Input Multiple-Output between two communication apparatuses, the method comprising the steps of: transmitting information containing the number of effective eigenvalues to the first communication apparatus (col. 4 lines 48-67).

Ling does not explicitly show that in the second communication apparatus, calculating an eigenvalue by performing eigenvalue calculation using a received signal, calculating the number of effective eigenvalues, said number of effective eigenvalues being the number of eigenvalues greater than a predetermined threshold.

In the same field of endeavor, Kim teaches in the second communication apparatus, calculating an eigenvalue by performing eigenvalue calculation using a received signal, calculating the number of effective eigenvalues, said number of

effective eigenvalues being the number of eigenvalues greater than a predetermined threshold (fig. 5 col. 8 lines 40-59).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use, in the second communication apparatus, calculating an eigenvalue by performing eigenvalue calculation using a received signal, calculating the number of effective eigenvalues, said number of effective eigenvalues being the number of eigenvalues greater than a predetermined threshold, as taught by Kim, in order to provide a mobile communication apparatus with multiple transmission and reception antennas, in which long-term information and short-term information reflecting the downlink characteristic of spatial channels for each of the transmission and reception antennas of the base station and mobile stations, which have multiple transmission and reception antennas, respectively, are fed back from a mobile station to a base station to minimize the effects of interference and noise and to maximize data transmission throughput, thereby minimizing fading effects.

Ling and Kim in combination, fail to teach in a first communication apparatus, forming a predetermined directivity by array antennas, and transmitting a signal from each antenna to a second communication apparatus; in the first communication apparatus, controlling the number of multiplex sequences of the transmission data based on the number of effective eigenvalues, performs serial to parallel conversion on transmission data of one sequence into transmission data of the number of multiplex sequences; and transmitting the transmission data of each sequence via different transmission streams by space-time coding to the second communication apparatus.

However, Hwang teaches in a first communication apparatus, forming a predetermined directivity by array antennas, and transmitting a signal from each antenna to a second communication apparatus (col. 8 line 36 through col. 9 line 5); in the first communication apparatus, controlling the number of multiplex sequences of the transmission data based on the number of effective eigenvalues, performs serial to parallel conversion on transmission data of one sequence into transmission data of the number of multiplex sequences (col. 8 line 36 through col. 9 line 5 and col. 10 lines 25-55); and transmitting the transmission data of each sequence via different transmission streams by space-time coding to the second communication apparatus (col. 8 line 36 through col. 9 line 5).

Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosing of Hwang into view of Ling and Kim, in order to provide a data transmission/reception apparatus and method for maximizing a data rate in a mobile communication system using space-time trellis code.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the maiKitamura date of this action. In the event a first reply is filed within TWO MONTHS of the maiKitamura date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the maiKitamura date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any response to this action should be mailed to:

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Commissioner for Patents

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan H. Nguyen whose telephone number is (571) 272-8329. The examiner can normally be reached on 8:00Am - 5:00Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Maung Nay A. can be reached on (571) 272-7882. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

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/Tuan Nguyen/
Examiner
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